MaineDOT Resource Allocation Policy

This policy establishes general and flexible decision-making guidance on how MaineDOT should effectively spend its resources to advance its mission and goals as far as possible**.**

1. Meet system preservation needs.
Good management of a large system of capital facilities like the State's transportation system requires a continuing investment in system preservation.

2. Invest in system modernization needs for all modes second.
When system preservation needs have been addressed, MaineDOT will invest its resources in the significant number of transportation infrastructure modernization needs. A safe and efficient transportation system is key to the State's economic growth.

3. Invest in transportation system management and travel demand management alternatives.
In today's economic and environmental climate, the demand for transportation mobility must be addressed, to the extent possible, through actions that maximize the efficiency of our existing transportation infrastructure.

4. Invest in all modes of transportation.
MaineDOT must continue its efforts to provide a "seamless" interconnection between all modes, both for passengers and freight. Mobility options such as trains, buses, air and ferries can be efficient, environmentally sensitive and cost-effective modal choices.

5. Target limited resources for new capacity to the highest priorities.
Funding for new capacity projects is extremely limited. Only those projects supporting State and regional transportation goals and strategies and those that have demonstrated merit and strong public support will be considered.

5.1 Highways

MaineDOT monitors the condition of approximately 9,000 miles of the state's public highway network using the Automatic Road Analyzer (ARAN) vehicle. The monitoring program is performed on a two-year cycle. Data on the condition of highways in the southern half of the state is collected in even-numbered years, and data for the northern half of the state is collected in odd-numbered years. Interstate system data is collected annually. This data is used to identify necessary funding levels for the upcoming BTIPS.

The data collected includes information about pavement condition, which is used by MaineDOT's Pavement Management System—a set of tools that assists planners and designers in:

- Optimizing the effectiveness of pavement expenditures by providing timely recommendations on treatment alternatives and locations to protect the current investment in highways and reduce users costs.
- Improving the efficiency of decision-making.
- Monitoring the consequences of decisions. This is accomplished by monitoring the life cycle of treatment types.

The goals of MaineDOT's Pavement Management System are to maintain the present average network condition, prevent increases in deficient and unacceptable highways, and maintain the present distribution of conditions within each system (See Section 3.1.2).

MaineDOT's highway expenditures are broken up into three categories: Highway Improvements, Pavement Preservation, and Maintenance Paving.

5.1.1 Highway Improvement Projects are generally those projects involving an unbuilt roadway in order to improve the condition of the road to meet modern standards (adequate drainage, base, pavement to carry the traffic load, sight distance, geometry and width).

Unbuilt Miles by Federal Functional Class and $ to Repair

Table 5.1.1

FFC	Miles	$ to Repair
Principal Arterials	90	$136,870,000
Minor Arterials	216	$333,150,000
Major Collectors	1813	$816,000,000
Total	**2119**	**$1,286,000,000**

Highway Improvement Projects can be divided into three major categories. The first category would be Collector Highway Improvement Projects (CHIPs). These projects are done on the State's Major Collector highway system. These projects are designed to meet state design standards, which are less stringent than American Association of State Highway Officials (AASHTO) standards. State standards are governed by the average annual daily traffic (AADT) on a given section of highway. For example, a major collector with a projected AADT of 3500 for the design life of the project would be constructed with a travel lane width of 11' and 3' paved shoulders. MaineDOT intends to rebuild approximately 100 miles of rural major collector highway per biennium to make progress on the 1600 miles of existing major collector backlog.

Summary of Resurfacing and Highway Improvement Expenditures by BTIP

Table 5.1.2

Summary of Highway Improvements
FY 1998-1999, FY 2000-2001, FY 2002-2003
(Cost in Millions)

	1998-1999 BTIP		2000-2001 BTIP		2002-2003 BTIP	
	Miles	**Cost**	**Miles**	**Cost**	**Miles**	**Cost**
Highway Improvements						
Principal Arterial	30.8	$45.2	22.9	$33.9	28.1	$38.6
Minor Arterial	39.4	$28.9	20.2	$22.4	27.5	$28.7
Major Collector	36.4	$19.9	101.4	$44.1	110.8	$68.9
Minor Collector	39.1	$12.5	25.4	$4.4	55.1	$17.5
Total Improvement	**145.7**	**$106.5**	**169.9**	**$104.8**	**221.5**	**$153.7**
Pavement Preservation						
Interstate	86.0	$14.3	64.0	$12.4	44.6	$9.7
Principal Arterial	67.0	$14.6	119.0	$21.8	80.9	$20.6
Minor Arterial	123.0	$16.1	137.0	$22.7	139.5	$31.7
Major Collector	184.0	$12.6	149.0	$19.1	135.9	$29.4
Total Resurfacing	**460.0**	**$57.6**	**469.0**	**$76.0**	**400.9**	**$91.4**

The second major category of highway improvements is improvements to the rural arterial system. These roads, since they are part of the arterial highway system, are usually designed to AASHTO standards, although low volume rural arterials may sometimes be designed using State Standards. Arterials built to AASHTO standards will generally be built with 12' travel lanes and 6'-8' paved shoulders. In 1999 the Maine Legislature mandated that MaineDOT submit biennial budgets to reconstruct all unbuilt sections of the rural arterial highway system by 2009. In

response to this mandate MaineDOT will strive to program 60 miles of rural arterial highway improvements per biennium. There is approximately 235 miles of rural arterial backlog remaining.

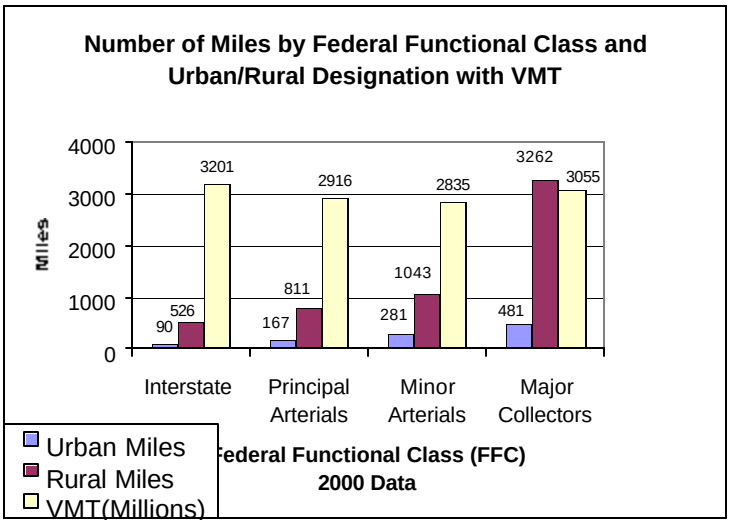
The third category would be urban highway improvements. In the greater Bangor, Kittery, Lewiston-Auburn and Portland areas, the federally designated Metropolitan Planning Organizations (MPO) are responsible for transportation planning and capital improvement decision-making. MaineDOT works closely with each of the four MPO's to develop and manage transportation projects.

In addition to those three major categories, there is also the Rural Road Initiative (RRI) Program. These are projects on minor collectors, which require a 33% match by the local municipality and the remaining 67% by the State.

5.1.2 Pavement Preservation

Pavement Preservation Projects are those done on a built highway to preserve the condition and to cost effectively extend the life of the pavement. These treatments can be applied to any built road with a Federal Functional Class of Major Collector or higher. The purpose of pavement preservation is to maintain good road conditions. Pavement Preservation is the first priority for funding, and it's critical that the Department apply the right treatment at the right time to minimize life cycle costs. These treatments can be done at a lower cost per mile than highway improvements, and allows more miles to be covered at a lower cost per mile. If pavement preservation is not done when it's needed, then a built section of road risks deteriorating to the point that it needs a highway improvement type treatment. This comes at a much higher cost per mile, to restore the road to good condition.

Figure 5.1.1



The following graphic depicts the recommended pavement preservation expenditures for the next four BTIPS. Optimum investment in the highway system would consist of a mix of spending on pavement preservation and highway improvements. When the funding levels are reduced, the available money should be directed to preservation of the built system, protecting the investment made in that system. Any additional funding available after preservation needs have been met can then be applied to upgrading unbuilt highways.

For the next biennium, an increase in funding of 20% in the pavement preservation program would meet all of the preservation needs on the built system. That would translate into about 900 miles of built roads receiving a treatment. With status quo funding, the Department would only be able to treat about 600 miles, leaving 300 miles of preservation needs unmet. The result would be 300 miles that would require a more substantial treatment in the next biennial work plan at a higher cost per mile. Similarly, with a 20% reduction in preservation funding, the Department would be able to treat about 450 miles, leaving 450 miles of preservation needs unmet. Again, this would result in those 450 miles needing a more substantial treatment in the next biennium at a higher cost per mile.

5.1.3 Maintenance Paving

Maintenance Paving is defined as paving that is done primarily on the unbuilt system of highways in order to keep those roads in a serviceable condition until a more substantial treatment can be done. Maintenance paving is most commonly used as a holding action and does not address issues of drainage, sight distance, or structural adequacy.

Summary of Maintenance Paving Activities by BTIP

Table 5.1.3

BTIP Years	Miles	Cost in Millions
1992-93	893	$8.9
1994-95	787	$7.9
1996-97	1434	$14.7
1998-99	1401	$16.4
2000-01	1436	$14.7
2002-03	1450	$20.4

5.1.4 Treatment Methods, Costs, and Life Expectancy

The various methods of treatment provided under each of MaineDOT's three categories of highway expenditures are summarized in Table 5.1.4. For more detailed treatment information, see Appendix C.

Treatment Type, Cost and Life Expectancy

Table 5.1.4

Expenditure Type	Treatment Type		Price Per Centerline Mile	Expected Life in Years
Highway Improvement	New construction, reconstruction, rehabilitation, reclamation, or CHIP		$0.4-1.8 million	15-20
Pavement Preservation	Pavement Preventive Maintenance	Crack Seal	$4000	2-4
		Microsurfacing	$50,000-60,000	6
		¾" Overlay	$84,000	6-8
	Level II Highway Resurfacing		$230,000	8-12
Maintenance Paving	Hot mulch		$17,000	4-6

5.1.5 Treatment History

Treatments to Maine's highways can be placed in two categories, Major Treatments and Resurfacing. The distinct difference in these two categories of improvements is the expected service life. A Major Treatment can be expected to last 15-20 years and would remove a roadway from the unbuilt (backlog) listing. A resurfacing project is done as part of the pavement preservation program, to a previously built roadway, with an expected service life of 8-12 years.

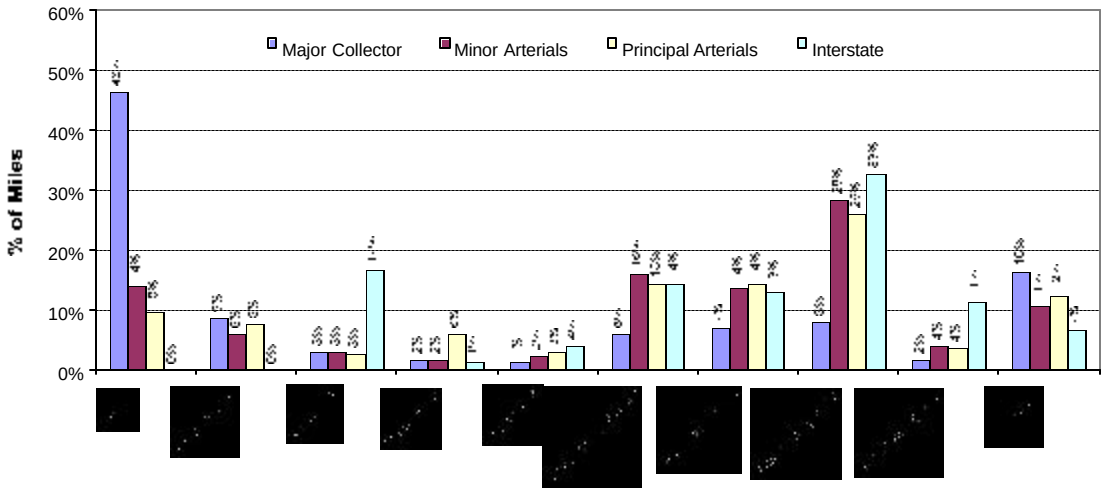
Figure 5.1.2 shows the status of the Routed Highway System (base year 2003) by latest treatment (see appendix B for maps and tables), roadways that have not been built to a modern standard are shown as 'unbuilt'. The unknown category is comprised of built roadways that, for one reason or another, have not received a treatment in the last 18 years other than a maintenance mulch holding activity, or where there is missing data.

Figure 5.1.2 shows that historically there has been:

- resurfacing of 25%-30% of the arterial system every six years
- a major treatment to 3% to 5% of the arterial system every six years
- 17% of the interstate system has received a major treatment in the last six years
- 32% (2,110 miles) of the Arterial and Major Collector system is unbuilt.

Figure 5.1.2

Routed Highways
Latest Treatment(Built) & Unbuilt by FFC



Age (years) by Scope

As suggested by figure 5.1.2 and confirmed by the Table 5.1.2, there has been a significant increase in investment in both the pavement preservation program and the highway improvement program. Over the last three BTIPs, there has been a 59 % increase in resurfacing funding and a 44% increase in highway improvement funding. In the 2002-2003 BTIP over 620 miles of highway were addressed by one of these treatment methods.

5.1.6 Highway Adequacy

Table 5.1.5

Data Element	Arterials & Collectors Point weighting:
PCR Pavement Condition Rating	45
Safety	20
Built vs. Unbuilt	15
AADT/C	10
Posted Speed	5
Paved Shoulder	5
Total	**100**

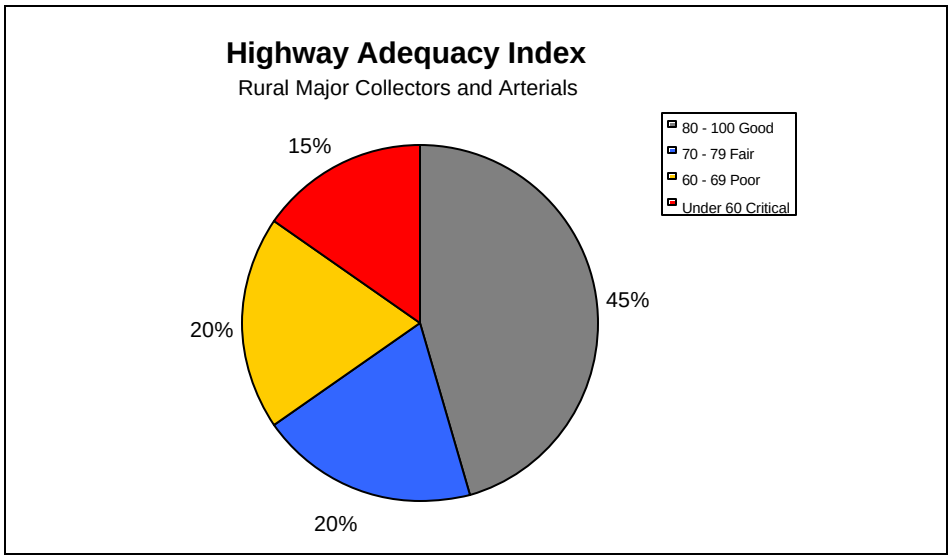
The Highway Adequacy Index is an empirical evaluation of the health of a particular highway segment. The Adequacy Index is based on 6 basic elements of the condition or performance of the roadway. The Highway Adequacy Index is a cumulative score on a scale from 0 to 100. The basic elements are listed in table 5.1.5 with their respective point weighting.

Rating elements were chosen based on three considerations: significance to a highway's performance, reliability and accessibility of data, and the data elements' sensitivity to outside forces. The resulting index evaluates the condition, safety, and mobility of a roadway segment. MaineDOT's intent is to utilize this index as a measure of the value of the highway system over time.

A complete discussion of the individual factors, their origins, and the methodology for calculation can be found in the appendix of this report.

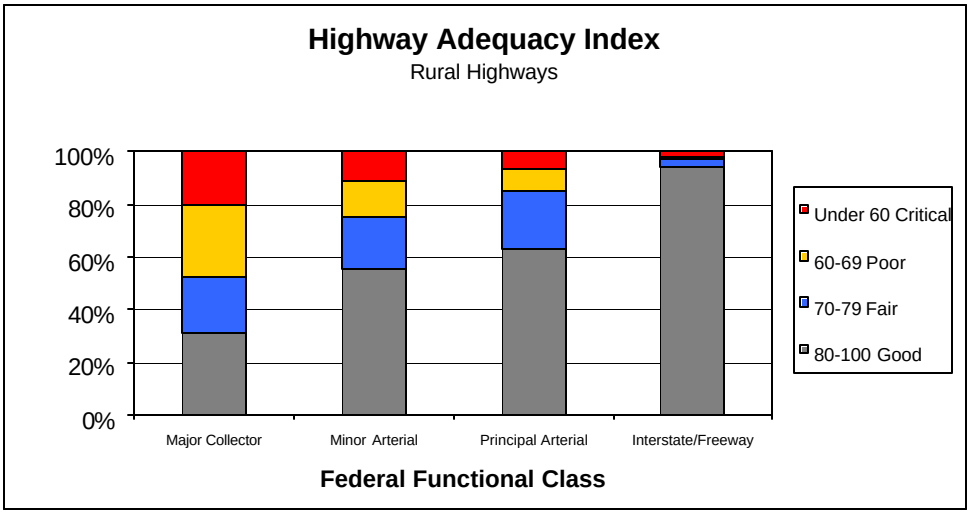
The Adequacy Index on rural roadways depicted below indicates that 45% of the roadway mileage is considered "good" with an index of at least 80. While 15% of the highway mileage is considered to be "critical".

Figure 5.1.3



Within each functional class there are significant differences in the distribution of highway adequacy ratings. Figure 5.1.4 illustrates these variations.

Figure 5.1.4



Over 94% of the rural Interstate System mileage is rated "good". However, this system only comprises slightly over 9% of the rural mileage. In Contrast, only 53%

of the Major Collector System is "fair" or "good", while this system accounts for nearly 58% of the rural mileage. Of the 858 miles of rural highway that are rated "critical", 672 of these miles are major collectors.

It is evident that the scoring is weighted quite heavily towards the Pavement Condition Rating of a highway with 45% of the Index coming from PCR. Thus it is likely not a coincidence that the percentages of highways rated "good" on the major collector system is very similar to the percentage of mileage that has been built. This apparent correlation leads to the conclusion that the best way to improve the overall highway adequacy of a section of highway is to build it to modern highway standards.

Divisional summaries for all routed highways and corresponding maps are provided in the appendix of this report as well as the Highway and Bridge Adequacy Report.

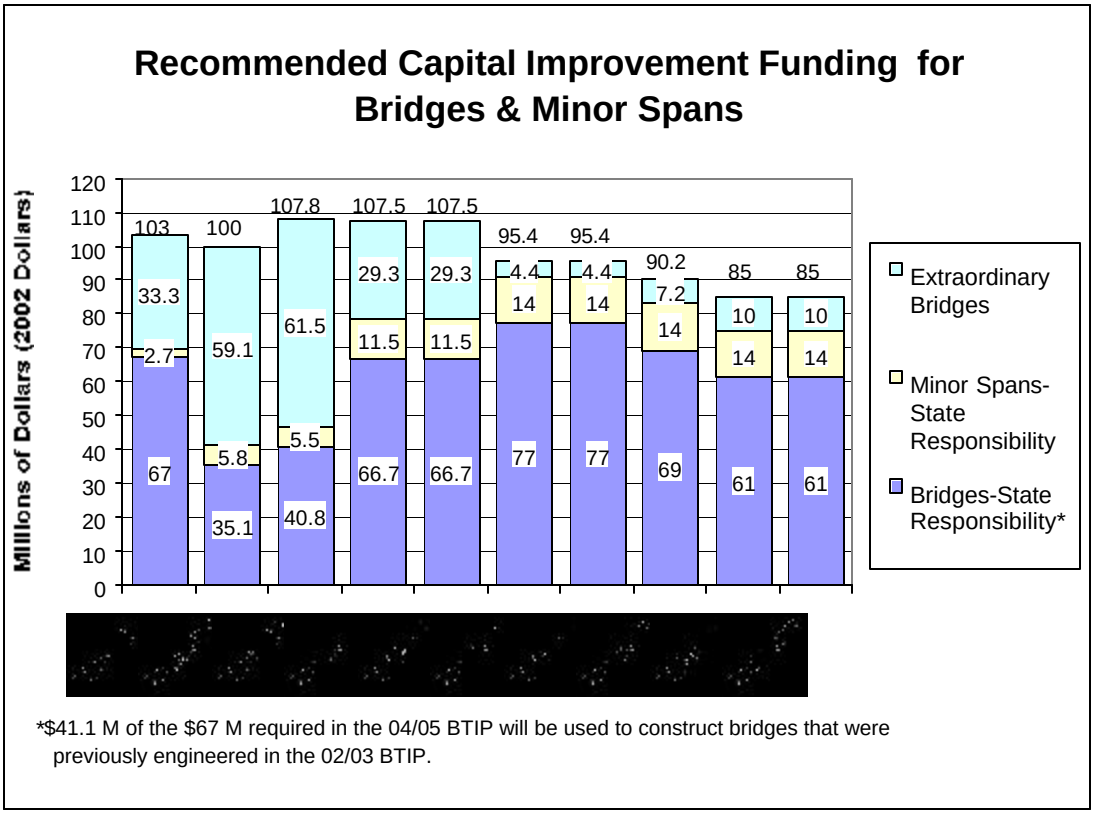
5.1.7 Visitor Information Centers

The following presents the current and future budgetary needs for the implementation of the State Visitor Information Center.

	Maintenance and Operations Funding per Biennium		
	Current	**Additional After Ten-Years**	**Total After Ten-Years**
MDOT			
Rest Area Maintenance and Operations	$2,238,000	$2,065,000	$4,303,000
VIC Heat and Lights (Hampden, Kittery, Houlton, and Yarmouth)	$71,800	$0	$71,800
Subtotal MDOT Funding	$2,309,800	$2,065,000	$4,374,800
Department of Economic and Community Development			
System Administration Costs	$307,164	$120,000	$427,164
VIC Maintenance and Operations (includes heat and lights for new VICs)	$1,167,434	$748,800	$1,916,234
Subtotal DECD Funding	$1,474,598	$868,800	$2,343,398
Total Funding	$3,784,398	$2,933,800	$6,718,198

5.2 Bridges

Figure 5.2.1. Funding Needs in the Future



*$41.1 M of the $67 M required in the 04/05 BTIP will be used to construct bridges that were previously engineered in the 02/03 BTIP.

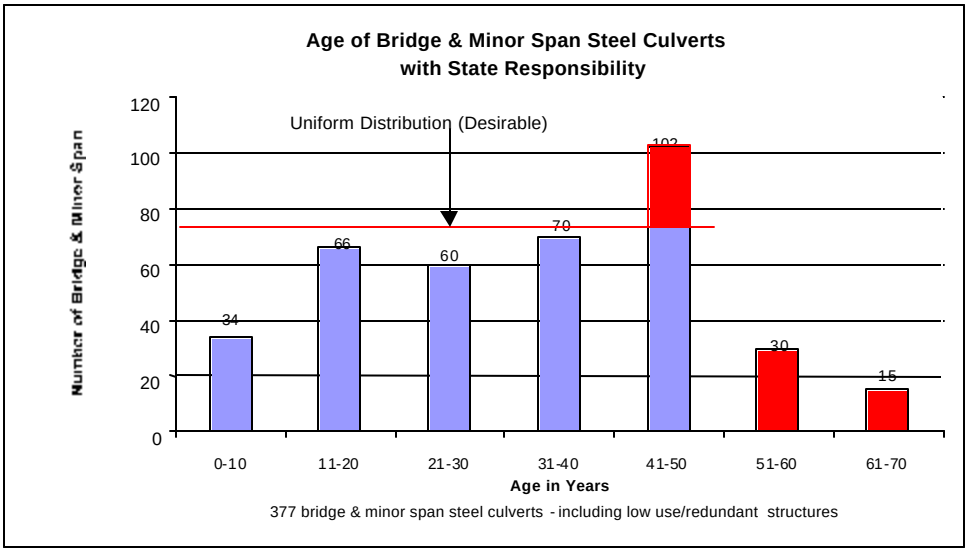
The bridge projections in this report were established using the methodology developed in the MaineDOT Bridge Management Section. The scopes and costs of future improvements, and the timing of the improvements, were individually determined using inspection ratings and inventory data, and based in part on field reviews conducted by bridge engineers and environmental scientists. Figure 5.2.1 depicts the funding levels needed to address all the bridge and minor span needs and the extraordinary bridge needs statewide over the next 20 years. On average, MaineDOT has expended $95 million per BTIP to address structural needs over the last six years, with 40% of available funds used to address the capital improvement needs of extraordinary bridges. However, that level of funding will not adequately address the projected capital improvement needs of Maine's structures, as indicated in Figure 5.2.1. MaineDOT is facing an increased demand for funding of bridges and minor spans in the next 15 years. These projections are based upon historic trends in the decrease of sufficiency ratings over time, and professional engineering judgment. The increased need for funding in 7 to 10 years reflects the aging and end of service life of post depression era structures as well as the end of deck life (and paint) for interstate bridges constructed in the 1960's.

5.2.1 Age of Bridges and Minor Spans

The age distribution of Maine's structures provides one assessment of future needs. However, age alone should not be relied upon to determine the timing of improvements because current physical condition, local site conditions, and past rehabilitation have a major impact on remaining service life.

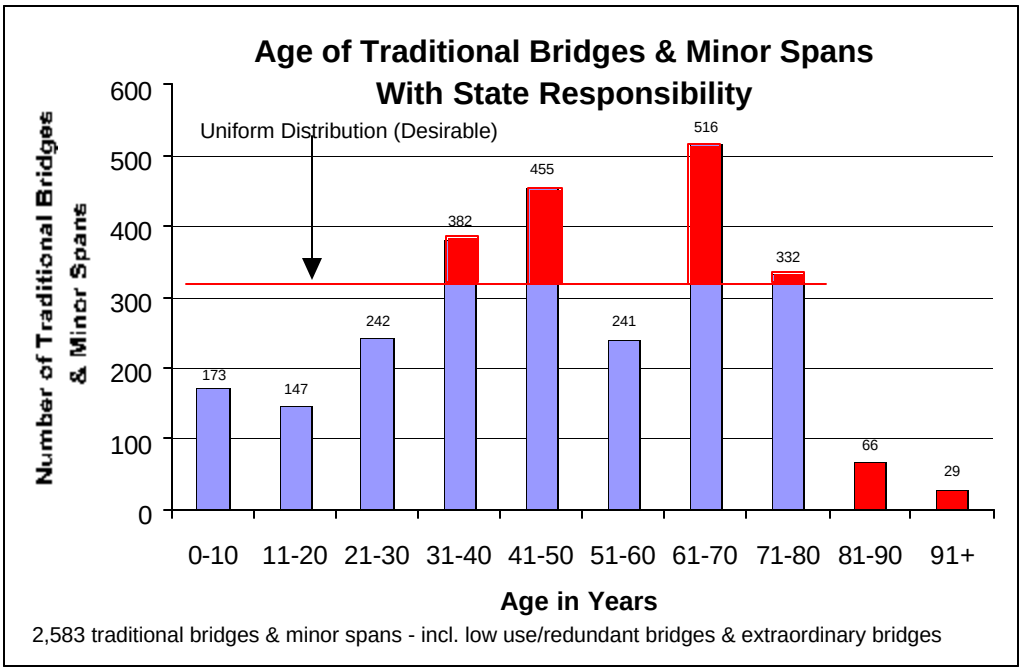
It would be desirable from a network management standpoint if the steel culvert bridges and minor spans were uniformly distributed with respect to remaining service life. With a life expectancy of 50 years, the uniform age distribution line in Figure 5.2.2 indicates that Maine has an over-abundance of older bridge and minor span steel culverts. Note the red portions of the bars. In the next 10 years, MaineDOT should address the 45 structures older than 50 years and the 27 aging structures above the uniform distribution line.

Figure 5.2.2



For traditional bridges and minor spans, a uniform age distribution is the preferred scenario. Traditional bridges have a life expectancy of about 80 years with MaineDOT's diligent maintenance, repair and rehabilitation. The uniform age distribution line in Figure 5.2.3 on the following page illustrates the desired scenario. Red portions of the bars indicate that the number of structures in the age group exceed the desired uniform distribution level and the fact that Maine has an over-abundance of older traditional bridges and minor spans. There are 95 structures older than 80 years and 195 aging structures above the uniform distribution line in the 61-70 year age group. These structures and those in the 71-80 year age group will need very close attention in the next 20 years.

Figure 5.2.3



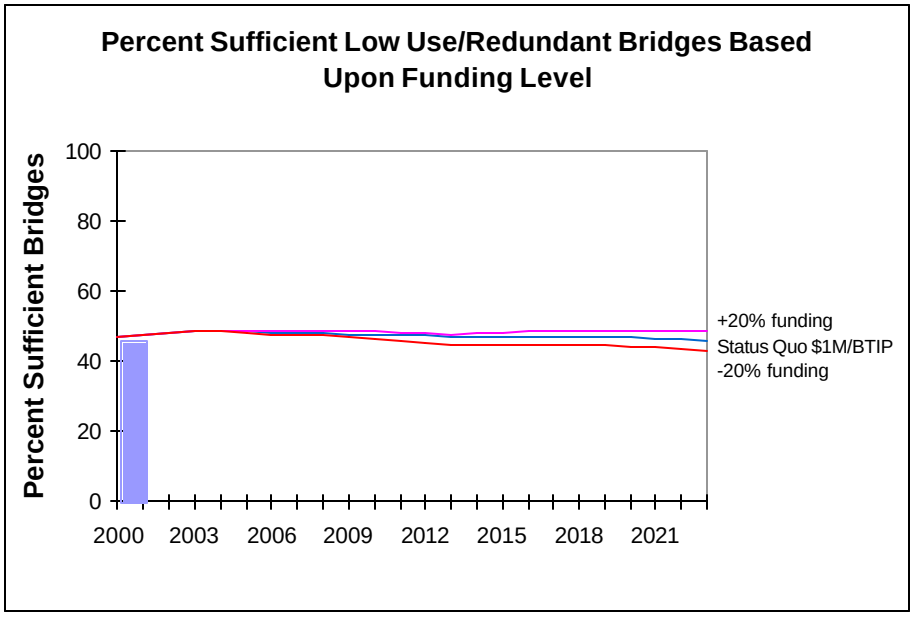
5.2.2 Percent Sufficient

The federal government gives structures a sufficiency rating [from 0 to 100 [0 is worst, 100 is best)] based on a combination of four separate factors that speak to the overall sufficiency of each structure [As described in Section 3]. A sufficiency rating of greater than 60 indicates capital improvement is not likely for at least 10 years, except for the possibility of paint or wearing surface work. Therefore, MaineDOT uses the percentage of structures with a sufficiency rating of greater than 60 as a measure of the overall condition of Maine's bridges and minor spans.

Low use/redundant bridges are those bridges on town ways that either serve fewer than 100 vehicles per day or are close to other crossings (average annual daily traffic multiplied by the detour length is less than 200). Some low use/redundant bridges have serious deficiencies from an engineering standpoint, but are given low priorities due to their minimal benefit to the traveling public. There are presently 219 low use/redundant bridges in the State of Maine.

Each of the last three BTIPs included an average of $1.1 million for low use/redundant bridge capital improvements. This level of funding has not been adequate to address the needs of structures in this category. In 2000, only 48% of the low use/redundant bridges were sufficient (assigned ratings of 60 or above). If MaineDOT continues to fund these bridges at the status quo level of $1.1 million per biennium, it is anticipated that the sufficiency of low use/redundant bridges will decline over the next 20 years.

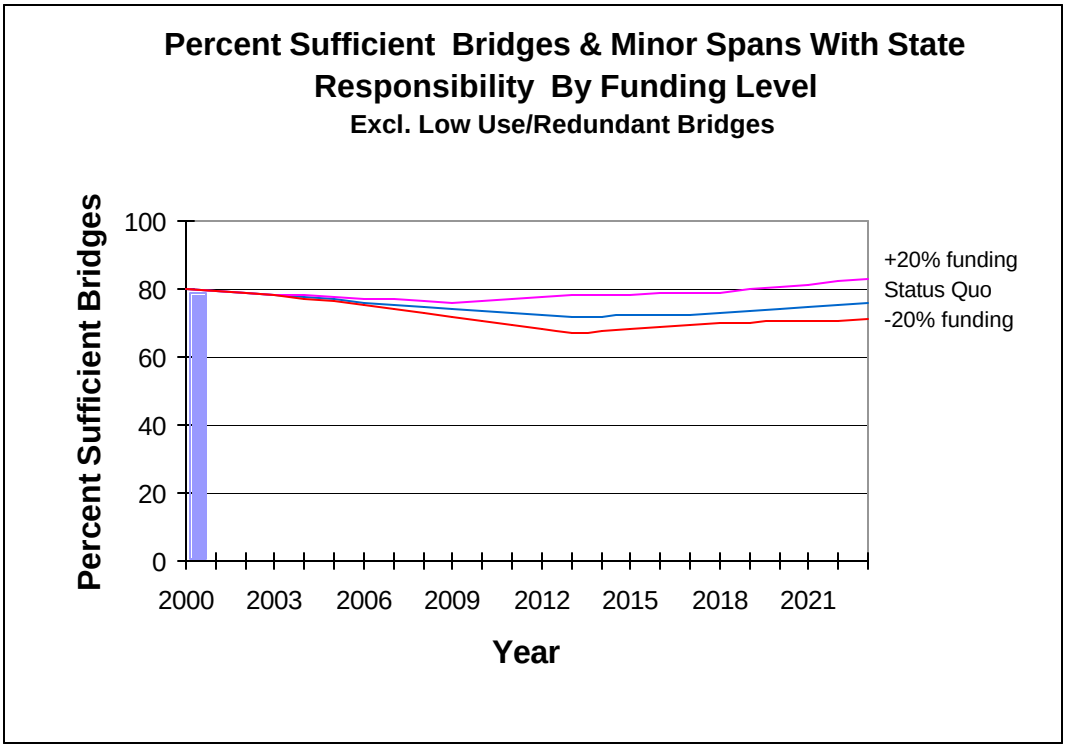
Figure 5.2.4



The State of Maine is responsible for the cost of capital improvements for 1,953 bridges that are 20 feet long or more. This group of structures includes bridges on town ways, state highways, and state aid roads. Over the last six years, MaineDOT has expended an average of $48 million per biennium to improve these structures and the result has been a slight increase in the percentage of sufficient bridges. In 2000, 80% of these bridges were sufficient.

However, the condition of the bridges on town ways, state highways, and state aid roads will gradually decline over the next six years if MaineDOT continues to invest an average of $95 million per biennium in capital improvements for all structures. If the status quo funding level is maintained, then only 74% of these structures will be sufficient in six years, a decrease of 6%.

Figure 5.2.5



The need to fund extraordinary bridge capital improvements has required that funds be diverted from the bridges on town ways, state aid roads, and state highways, leading to a gradual decline in their overall condition since 2000. If the funding for all structures is increased by 20%, then 76% of the bridges on town ways, state aid roads and state highways will be in sufficient condition in six years.

Figure 5.2.5 is based upon the following somewhat optimistic assumptions. First, it is assumed that capital improvement needs for extraordinary bridges will decrease dramatically by 2015, allowing a higher percentage of bridge funds to be expended on bridges on town ways, state highways, and state aid roads. This analysis also assumes that adequate funding is available to perform the prescribed capital improvements at the proper time. Deferral of needed capital improvements results in further unchecked structural deterioration and may lead to even higher capital improvement costs.

The State of Maine is totally responsible for funding capital improvements for 769 minor spans that carry state aid roads or state highways. There has been a significant downward trend in the sufficiency of minor spans since 1992. In 2000, 75% of the minor spans with state responsibility were sufficient, down from 87% in 1992. This negative trend indicates that the average level of funding for minor spans, $5 million per biennium over the last six years, is inadequate.

Table 5.2.1

Summary of Bridge Improvements*

Structure Category	1998/99 BTIP		2000/01 BTIP		2002/03 BTIP	
	No. Projects	Cost in millions	No. Projects	Cost in millions	No. Projects	Cost in millions
Bridges	61	44.9	56	43.0	51	44.1
Minor Spans	17	2.9	22	3.4	41	8.1
Low Use/Redundant	5	1.3	4	0.9	2	0.6
Extraordinary	3	67.1	5	23.0	5	35.3
Total Improvement	86	116.2	87	70.3	99	88.1

Note* Projects programmed for preliminary engineering only were excluded and costs were taken from published BTIPs.

If MaineDOT continues to fund capital improvements for minor spans at the level of $5 million per biennium, their condition will gradually decline in the next 20 years. A 20% increase in funding for minor spans ($6 million/biennium) would be adequate to address the needs of these structures for the next six years. However, that figure would have to be doubled to $12 million per biennium to keep pace with the minor span capital improvement needs from 2010 to 2013.

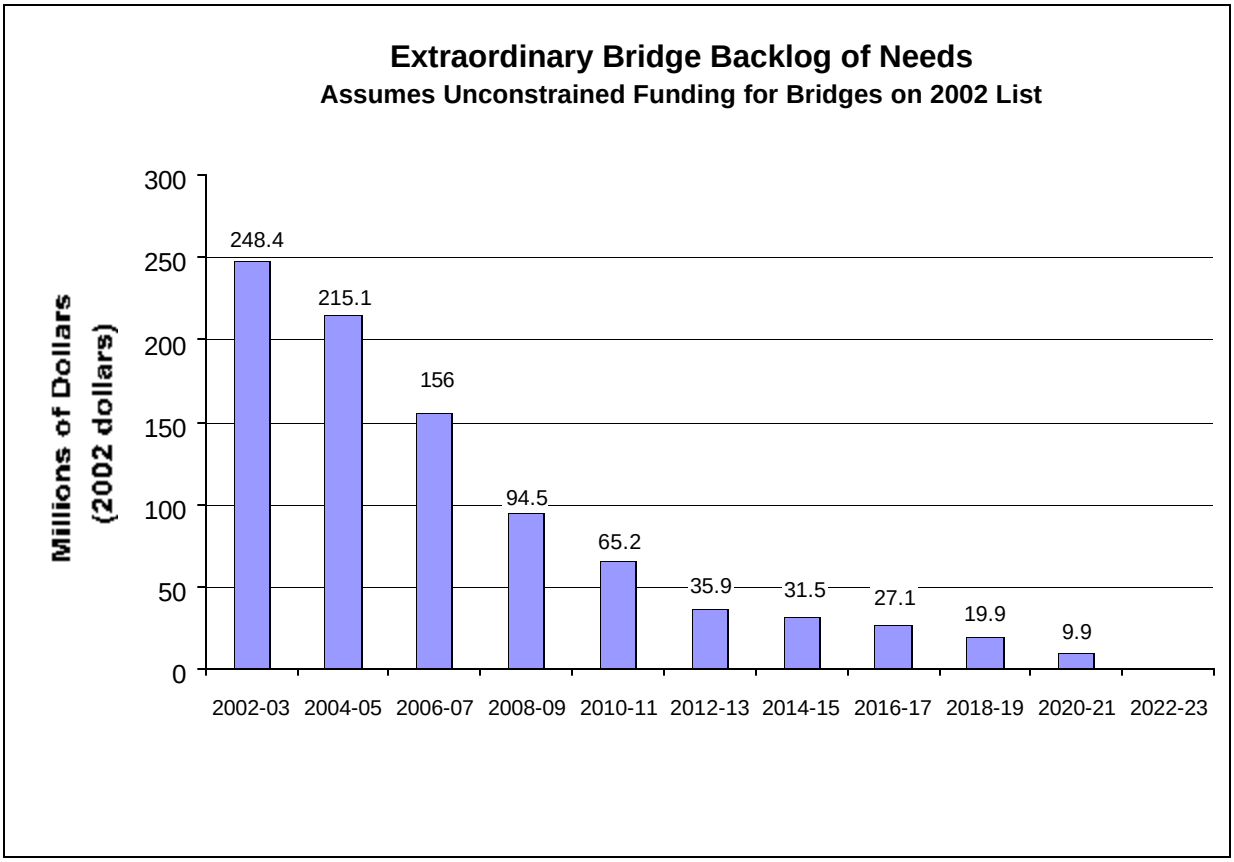
5.2.3 Priority Functional Need Bridges

Presently, MaineDOT has identified 32 structures as priority functional need bridges/minor spans. It is estimated that improvements necessary to correct these functional deficiencies will cost approximately $33 million. This $33 million in needs is not accounted for elsewhere in this report.

5.2.4 Extraordinary Bridges

In 1994, the extraordinary bridges required $443 million worth of capital improvements. The extraordinary bridge capital improvement needs have since been decreased by nearly half, with $248.4 million worth of work remaining. While this represents a significant improvement, it is important to note that several of the 19 extraordinary bridges that still require capital improvement are in very poor condition. If the remaining extraordinary bridge improvements are funded in the time period recommended by MaineDOT, ($33 million in 2004/05 and $59 million in 2006/07) the remaining capital improvement needs of extraordinary bridges will be reduced by nearly 40%. Timely action will also result in decreased bridge maintenance costs for extraordinary bridges.

Figure 5.2.6



There are some traditional bridges that are 250 feet or more in length with capital improvement costs approaching $5 million. Over time, inflation may cause the improvement costs to rise to $5 million or more. At that point, these traditional structures will qualify as extraordinary bridges by definition and will impact future funding scenarios.

5.3 Safety

Safety is a key consideration in the design of every project. With the possible exception of the Maintenance Mulch Program, all MaineDOT construction projects consider safety, and incorporate safety improvements. Additionally, as prescribed by federal law, 10% of the Surface Transportation Program (see Table 5.3.1 on the following page) must be set-aside for the Highway Safety Improvement Program (HSIP); additional funding may be provided at the state's discretion. The program consists of two program areas: Hazard Elimination and Highway-Railroad Grade Crossing Improvements.

5.3.1 Hazard Elimination Program

The Hazard Elimination Program (HEP) funds projects whose primary purpose is to improve road safety. The HEP currently addresses two road safety areas:

- Existing high hazard locations
- Areas not meeting minimum safety standards

In order to address existing high hazard locations, MaineDOT maintains a statewide crash database. Each year, statewide average crash rates are calculated for various road classifications and urban/rural designations. High hazard locations are identified by comparing all locations to the appropriate statewide average crash rate. Those locations that exhibit a statistically significant higher crash rate than the average for all other similar locations with similar traffic exposure and that have experienced at least eight crashes within the most recent three-year period are termed High Crash Locations (HCLs). The number of HCLs dropped from 1,454 for the 1996-1998 period to 1,091 for the 1999-2001 time frame.

Filters such as number of crashes, crash severity and identified patterns are applied to the HCLs listing to obtain a manageable number of candidate projects. Municipal requests for safety projects are also considered. Life cycle cost for capital improvements are compared to anticipated injury cost reductions. Those locations exhibiting the greatest crash cost reduction (benefit) to life cycle (capital plus operational) cost get funded first.

The HEP is also used to address locations that do not meet minimum safety standards. These are systemic enhancements shown to have high benefit-to-cost ratios, such as continuous shoulder rumble strips on rural interstate highways and guardrail improvements.

By federal regulation, the HEP must be directed to all public roads, including local roads. The federal participation rate is 90%. State money is used for the 10% match, except that municipalities provide the 10% match for projects on local roads only. Recent typical program areas include intersection

improvements such as traffic signal installations or upgrades, realignment and lane additions. Non-intersection improvements have included roadside clear zone improvements, guardrail upgrades, and rumble strip installations on rural sections of the interstate system.

Over the past three bienniums the HEP program has funded an average of 31 projects at $4,656,700 per biennium. The benefit-to-cost ratio for past safety projects has averaged more than 6 to 1. In other words, for every $1 spent on a project, there has been a $6 reduction in the estimated economic losses due to crashes.

Table 5.3.1

HSIP Funds Expended Over The Last Three Bienniums:				
Biennium	**GCIP Amount**	**Number of GCIP Projects**	**HEP Amount**	**Number of HEP Projects**
1998-1999	$1,708,450	13	$3,786,600	30
2000-2001	$2,550,000	23	$5,251,000	29
2002-2003	$1,910,000	18	$4,932,500	35

5.3.2 Grade Crossing Improvement Program

By federal regulation, the Grade Crossing Improvement Program (GCIP) applies to all rail grade crossings at all public roads, including local roads. Rail grade crossings are comparatively safe in Maine with most of the rail activity being slower moving freight trains. There have been no vehicle-train collision fatalities at any public crossing since 1992. MaineDOT has thus chosen to spend the minimum allowable federal funds on grade crossings. Per Transportation Equity Act for the 21st Century (TEA-21) regulations, the minimum allowable expenditure for grade crossings is the amount a state expended in 1991. For Maine the total program amount is about $2.0 million per biennium. The remainder of the HSIP funds is applied to Maine's Hazard Elimination Program (HEP).

Per federal regulations, at least half of the GCIP must be directed to the installation or improvement of active warning devices such as lights, bells and/or gates. The remainder of the funds can be applied to improving the crossing surface. As shown in Table 5.3.2, about 28% of Maine's public rail crossings have a surface score of 5 or more. (The higher the score, the rougher the surface.) It would cost about $10 million to upgrade all crossing surfaces to a "good" (better than "5") level. To maintain them at that level, the current

Table 5.3.2

Railroad Crossing Surface Score Summary

Surface Score	Number of Crossings	Percent of Total
No Score	15	2%
0.0 - 0.9	87	14%
1.0 - 1.9	53	9%
2.0 - 2.9	147	24%
3.0 - 3.9	28	4%
4.0 - 4.9	116	19%
5.0 - 6.9	109	17%
7.0 - 8.9	26	4%
9 and over	45	7%
Total	626	100%

investment rate of about $1.0 million per biennium for surface improvements is inadequate, assuming an average crossing surface life of 20 - 25 years.

The methods used to select GCIP projects are currently under review to ensure low-volume crossings receive appropriate treatment. A "minimum standards" approach may be used to ensure all public crossings are brought to current safety and surface condition standards.

5.3.3 Future Program Efforts

It is expected that highway crashes and injury severity will continue their downward trend. Safety improvements will continue to be carried on with every construction activity and through the FHWA Highway Safety Improvement Program (HSIP). MaineDOT will also continue to utilize its share of the TEA-21 Safety Incentive Program to fund safety activities such as a transportation safety media campaign, non-signalized intersection collision warning systems and other innovative projects. Vehicle safety improvements will also continue to effect reductions in crashes and their severity.

In addition to the general program areas previously described that address hazardous locations, MaineDOT has identified five safety areas of concern that it wants to proactively address:

- Run Off Road and Head On crashes, particularly on secondary roads
- Work Zones
- Commercial Vehicles
- Large Animals
- Human Factors

Over 60% of the fatalities resulting from Run Off Road and Head On collisions occur on rural secondary roads in Maine. The specific areas that will be addressed include public awareness activities, upgrading guardrail to meet current design standards, relocating utility poles, tree removal where advisable and pilot projects to consider the use of shoulder and centerline rumble strips at select locations. While it is recognized that rumble strips are of concern to bicyclists and motorcyclists, and can be noisy, there may be some appropriate application for this proven and inexpensive approach.

Twenty-five fatalities have occurred over the past ten years as a result of Work Zone crashes. MaineDOT will continue to increase public awareness and to work with its partners to improve work zone safety in Maine. The Work Zone Safety Awareness Week Campaign will continue to stress safety aspects to contractors, utilities, MaineDOT employees and the general public at the beginning of the Work Zone season (April). The ongoing transportation safety media campaign

will periodically highlight safe behaviors when driving through highway work areas.

Commercial vehicle use is expected to increase over the foreseeable future. As such, additional steps will be taken to educate the traveling public on sharing the road with commercial vehicles. MaineDOT will also work with its partners to ensure that commercial vehicles continue to improve their safety performance on Maine roads.

Crashes involving large animals (moose, deer and bear) have increased dramatically over the past ten years. MaineDOT will continue to work with its multi-agency task force to further define the problem and implement new, promising strategies to help reverse this trend (see Figure 4.2.12).

At least 80% of all crashes involve a significant human causative factor, and young driver fatalities are of particular concern. MaineDOT will continue and expand its Transportation Safety Media Campaign to address these and other issues as they arise.

5.4 Highway Mobility

As part of its investment policy, MaineDOT invests in a wide range of strategies to improvement highway mobility. These strategies include highway projects that improve mobility performance, with or without increases in highway capacity, and non-highway projects that offer improved alternatives to highway transportation. In accordance with the Sensible Transportation Policy Act, MaineDOT considers the full range of reasonable alternatives before investments are made to increase arterial highway capacity to address mobility needs.

As Section 4.3 illustrated, the future growth of traffic volume on Maine's arterials will lead to a rapid growth in traffic congestion if investments are not made to address highway mobility. Investments in mass transportation and non-highway transportations projects can enhance highway mobility by reducing the traffic demands on the highway network. Funding for these types of projects is addressed in sections 5.5. and 5.6 Investments in highway mobility projects address highway mobility needs by physically improving the arterial network. This section focuses on the funding scenarios and implications for these highway mobility projects.

5.4.1 Funding Scenarios

For the last three BTIPs (1998-99, 2000-01, and 2002-03), the funding level for mobility-enhancing highway projects has averaged $40 million per program. This programmed funding is in addition to other highway, bridge, safety, and non-highway capital expenditures described in Section 5 of this report. If this level of funding were to continue for the next 20 years, the investment in highway mobility projects would total $400 million in the equivalent of $20 million annual increments. This is the baseline, or status quo, funding scenario.

To evaluate the effects of changes in the baseline funding scenario, two additional funding scenarios were developed. The reduced funding scenario, at $16 million per year, is 20% less than the baseline scenario. The increased funding scenario, at $24 million per year, is 20% more than the baseline scenario.

5.4.2 Potential Actions

Each of the three funding scenarios has an impact on the mobility outlook for the arterial network in the 20-year period from 2000 to 2020. Major mobility-enhancing strategies for highways include the following:

Access Management: Preserving and enhancing mobility and safety qualities of a highway by actions such as purchase of access rights, consolidation of driveways and entrances, and other improvements in access point geometry is

called access management. Access management minimizes the potential for driveway/entrance traffic to erode the capacity, safety, and efficiency of an existing highway.

Widening for Auxiliary Lanes: Adding lanes such as left-turn (or right-turn) lanes and climbing/passing lanes to remove turning or slower moving traffic from thru lanes also enhance highway mobility. Turn lanes can be used effectively with or without access management on arterials where substantial turning traffic exists. Climbing lanes and passing lanes are effective on highway segments with a mix of vehicle speeds.

Installing Thru Lanes: Creating lanes on existing arterials to serve thru traffic provides significant increases in highway capacity where auxiliary lanes alone are not sufficient.

New Thru Lanes at a New Location: Creating new travel lanes on a new alignment to serve thru traffic is another highway mobility strategy. New highway capacity on a new location can serve large volumes of thru traffic that do not need access to the existing arterial. In the last three BTIPs, more than 80% of the programmed funding for highway mobility projects was directed toward the strategies of adding thru lanes on either existing highways or new locations. Less than 1% of the funding was directed toward access management projects.

5.4.3 Implications

An optimum investment of funds under the three scenarios will result in a mix of investments best suited to the need to improve mobility in the arterial network. In Table 5.4.1 these potential mixes are shown for each of the three scenarios. Under any of the scenarios, the optimal mix of investments is more balanced than traditional patterns of funding. The share of funding directed toward additional thru lanes would be reduced while the share for other strategies, particularly access management would be increased.

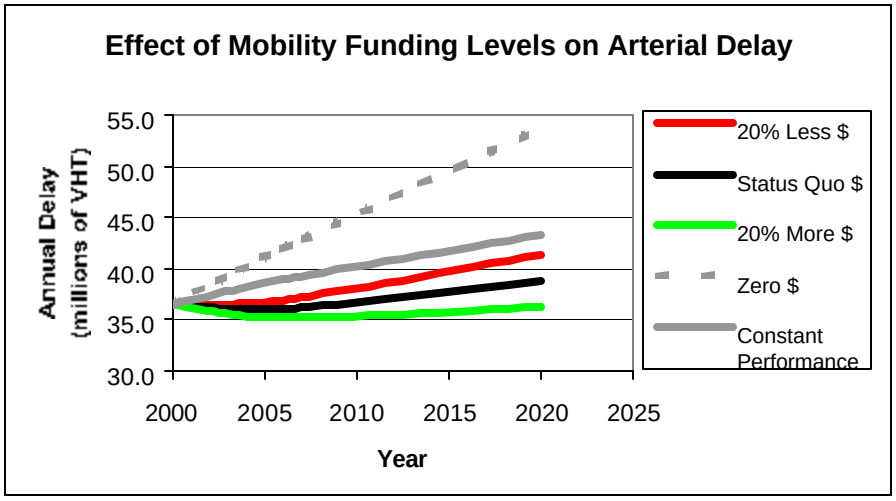
Potential Mix of Actions for Three Potential Funding Scenarios

Table 5.4.1

Funding Scenario	20% Less	Status Quo	20% More
Annual Investment ($ millions)	16	20	24
Mobility Improvement Strategy	Investment Share		
Access Management	30%	28%	26%
Installing Auxiliary Lanes	18%	18%	18%
Widening for Thru Lanes	30%	31%	32%
New Thru Lanes at New Location	22%	23%	24%

Figure 5.4.1 shows the impact of the three mobility funding scenarios on delay in the arterial network. Under the traffic growth projections described in Section 4.1.2, 20% more funding for mobility projects can hold delay on the arterial system close to current levels. Status quo funding or less would result in an increase in delay on the arterial network. On the 20-year horizon, a 20% increase or decrease in funding can make a 2.5 million vehicle-hour ($25 million) difference in annual delay.

Figure 5.4.1



Also shown for comparison in Figure 5.4.1 are a "Zero $" funding scenario and a "Constant Performance" trend line. These two lines, respectively, are equivalent to the delay and travel growth trends in Figure 4.3.3 The zero funding scenario shows growth in delay if no investments are made to improve mobility. The constant performance line shows a growth in delay that equals the growth in vehicle-miles traveled (VMT). If the growth in delay follows the constant performance line, then travelers would experience the same amount of delay per mile traveled as they do now. In the constant performance scenario, increased delay on the overall system is a result of an increase in use, not a decrease in mobility.

Scenarios with lines above the constant performance line indicate worse mobility for future travelers than current conditions provide. Comparison of the zero funding trend line with the constant performance line shows that the current highway mobility performance level cannot be sustained if no investments are made to enhance mobility. However, comparison of the constant performance trend line with the three potential funding scenarios shows that each scenario can result in future performance that is better for travelers than currently exists, with higher funding scenarios resulting in less delay than lower funding scenarios. One of the keys to improved performance under any scenario is a mix of funded actions that are implemented in locations where they can be most effective.

5.5 Funding of Passenger Transportation

On average, fare box revenues cover only 25% of the operating costs for public transit services. Federal, state, and local funds are necessary to meet operating deficits and to address maintenance and equipment needs. The Federal Transit Administration (FTA) is the primary source of federal funds. Limited state operating funding, approximately $500,000 a year, comes from the General Fund. Capital costs are addressed through FTA programs and State bonds. As cost rise, an increasing percent of funding comes form local sources, primarily from property taxes.

Funding for passenger transportation modes falls into two broad categories, capital funding and operating funding. Capital funding is used to procure vehicles and vessels, build new facilities, and rehabilitate existing ones as they age. The major sources for this category of funds are the Federal Transit Administration (FTA), Federal Highway Administration, and state bonds. For some projects a local match, usually 10%, is required.

Operating funds cover the costs of providing services not recovered by fares and other user fees. Since the second half of the 20th century, most passenger transportation services have required operating subsidies. Sources of these subsidies include the FTA, state general fund, and local municipalities. Federal and state funds are limited, increasing the dependence on local property tax revenues.

If additional funding became available, MaineDOT's passenger priorities are the expansion of the intermodal passenger system, as outlined in Explore Maine and the implementation of the Transit needs Study. Key elements are:

- the extension of Amtrak rail service north of Portland
- commuter rail services in appropriate corridors
- marine highway
- intermodal facilities
- three trail initiative
- local and regional transit systems to access the intermodal system.

Any reduction in spending would result in the curtailment of system expansion and would jeopardize existing services. Maine DOT, in this case, would try to maintain the core elements of the system.

5.5.1 Transit

Maine relies heavily on FTA funds for vehicle replacement. The state occasionally receives additional federal capital funds on an earmark-only (money for specific projects) basis. Bond funds are also used to match the earmarked funds.

Maine and the FTA, along with the local providers, have purchased and are operating 295 vehicles ranging in size from minivans to full size transit buses. More than half of those vehicles are completely beyond their federally established 'useful' life. Maine has begun a program to bring 50% of our vehicle fleet to within 50% of its useful life, thereby providing a modern transit fleet. This will take approximately $15 million over the next five years to fully implement. Additional funds will be required to expand fleets and services, convert to clean fuels, replace and build transit facilities, intermodal centers, bus garages, and other support facilities.

Maine annually receives almost $5 million in FTA program funds for operating transit services. This is matched with $545,000 in State General Funds. The remaining funds must be raised through the local municipalities. As operating costs have risen, the burden on the local communities has grown and is an ongoing difficulty for all municipalities in Maine.

Table 5.5.1

FY 2001 Operating Assistance	
Local	$4,003,000
State	$545,000
FTA	$4,814,415
Total	**$9,362,415**

Figure 5.5.1

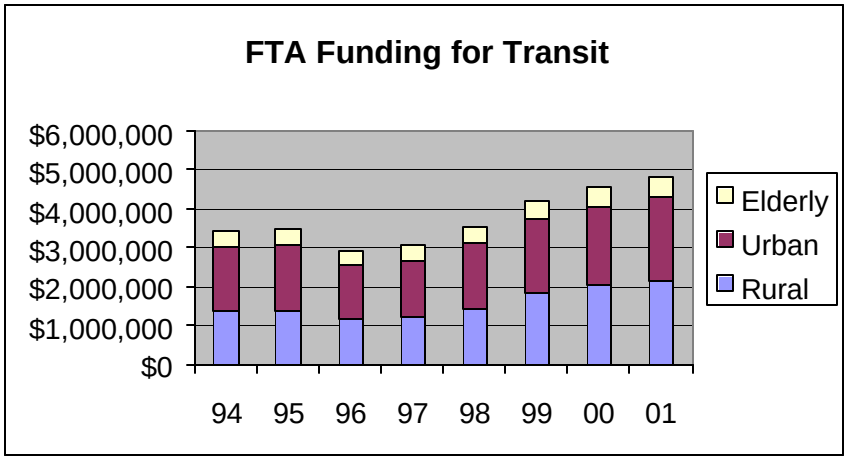


Table 5.5.2

FUNDING LEVELS BY MODE (Cost in Millions)			
	98/99	**00/01**	**02/03**
Air Transportation	23.4	24.6	38.5
MS Ferry Service	2.1	10.1	15.5
Transit	3.2	17.7	23.8
Intermodal	1.1	3.2	8.7
Marine highway	0.0	4.2	2.5
Non-Motorized	1.9	4.6	6.6
Rail	10.4	18.9	13.5
Transportation	0.8	0.4	1.2
Demand Management			
TOTAL	**42.9**	**83.5**	**110.3**

Data is currently unavailable on total costs and revenues for transit service due to reporting discrepancies. MaineDOT will address this by refining reporting requirements for providers.

Funding for new or expanded services is a concern. With the return of rail service and the success of the *Island Explorer,* many communities wish to expand or start seasonal or year-round services. Most federal programs for new starts provide funding for only three years, leaving the municipalities to cover the shortfall with local dollars or discontinue service when the federal funds run out. The *Island Explorer* on Mt. Desert Island is perhaps the most dramatic example of the ending of federal funds after a highly successful three-year start-up. Currently, funding sources are FTA 28%, local towns 13%, local business organizations 8%, local conservation organizations 8%, and the National Park Service 43%. No State General Fund money is currently used for the *Island Explorer* despite the area's major draw as a tourist attraction. The final year for federal Congestion Mitigation Air Quality Program (CMAQ) funding is 2002. A sustainable funding source needs to be established to continue this type of innovation that promotes economic development and protects our environment.

MaineDOT recently concluded an evaluation of unmet general public transit needs in Maine. This *Transit Needs Study* identified the need for $582,542 in additional state operating funds to implement new services with a total cost of $2 million, but did not address increasing social service transportation demands.

5.5.2 Airports

Over the past 30 years, all of Maine's airports have received approximately $120 million in state and federal funds for capital costs. They currently have a state funding level of $3.2 million annually for capital costs. New programs have been implemented to maintain and improve the condition of the airports and their approaches. The pavement preservation program and obstruction removal program are funded at $400,000 each year, and have been implemented to insure a minimum level of safety. Funding is not adequate to address all identified needs. Current needs have been identified at $110 million, with $14 million available from the Federal Aviation Administration and $3.5 million from state bonds.

Maintaining the current level of funding (status quo) will be adequate to maintain current service and maintenance schedules. The commercial service airports are continuously initiating new projects to maintain safety, security and service level. Current funding allows these safety projects to be complete first, while other safety-related projects take their queue in state programming.

The current schedule has a six-year waiting list of safety-related projects. A few projected projects are:

- Removing obstructions in Auburn-Lewiston's approaches
- Relocating terminal facilities in Belfast
- Obstruction removal in Auburn, Caribou, Eastport, and Frenchville
- Repairing the runway at Belfast airport
- Providing needed runway length at Northern Aroostook Regional Airport
- Repairing failing runway surfaces in Carrabasset Valley, Greenville, Jackman, Millinocket, Rockland, Augusta, and Waterville.

Capacity projects that are scheduled beyond the six-year waiting list include:

- Parallel taxiways for Wiscasset, Auburn-Lewiston, Rockland, and Fryeburg
- A precision approach for Houlton
- Aircraft parking ramp repair for Auburn-Lewiston, Hancock-County - Bar Harbor, Belfast, Bethel, Dexter, and Millinocket
- Terminal rehabilitation, including new security initiatives at Augusta, Rockland, and Bar Harbor.

A 20% increase in funding would allow the safety issues to be addressed earlier and the capacity projects to be implemented. This would allow the airports to provide economic growth to the local communities by providing airport services above and beyond the minimum safety requirements, and possibly to attract businesses interested in locating and doing business near an accommodating aviation infrastructure.

If funding was cut 20%, pavements would begin to fail, approaches would be compromised, and growth would cease. Future funding would be higher due to the higher expense of replacement as opposed to maintenance. By not providing the capacity needed to grow, this would also cause safety to be compromised and create a slowdown in the economic activity that airports provide to their local economy.

5.5.3 Passenger Rail Service

There is no current "program" budget for passenger rail development. The next priority is the upgrade of the tracks between Portland and Brunswick (27 miles) for passenger use. This includes upgrade and realignment of the Union Branch in Portland and construction of a new trestle across Back Bay. This rail connection will use a combination of state-owned, Guilford, and Saint Lawrence and Atlantic right-of-way. When complete, this "core system," Portland to Boston and Portland to Rockland, will comprise approximately 126 miles of track, with approximately half in public ownership.

As these key elements are completed, MaineDOT will pursue extension of the passenger rail system from Brunswick to Lewiston-Auburn and on to Montreal, and north to Bangor, connecting to Mount Desert Island.

MaineDOT currently budgets $150,000 of state funds for maintenance of 300 miles of state-owned rail infrastructure each year. However, this funding only takes care of brush clearing and the most basic maintenance needs. It will not provide for tie replacement, ballast maintenance, and rail alignment. If adequate funding is not provided, the quality of the rail system will decrease and result in the mandatory slow down of all rail equipment using the line. This, too, could result in reduced passenger usage and potential failure of passenger operations. Funding is needed for maintenance at approximately $1.8M annually.

Current estimates are $2,000 per mile to maintain an inactive line, and $6,000 to $10,000 per mile for maintenance of an active line. Maintenance of the state-owned passenger system starting in 2003 should run around $400,000 per year with costs increasing as the infrastructure ages. In addition, subsidies may be required to entice private rail operators to maintain their infrastructure at levels that will provide adequate passenger service.

5.5.4 Ferries

In past years, the MSFS had to delay maintenance of vessels and facilities to cover operating costs. Current revenues ($2.4 million) and state operating assistance ($2.1 million), however, are adequate to cover operating costs. This has resulted in the reinstitution of an appropriate maintenance program. Proper maintenance in the long run will prolong the life of vessels and other infrastructure, which should reduce the need for more costly replacement projects. The current maintenance budget is $500,000 annually.

Over the next six years the four remaining pens and piers will need to be refurbished with an estimated cost of $10 million. In the next 20 years, five new vessels will be needed. Funding for these projects has not been secured. While the cost of a replacement vessel for the Governor Curtis alone is $5.5 million, MaineDOT has only been able to secure $250,000 in FHWA Ferry Boat Discretionary funds to replace the fleet's aged vessels.

Maintaining the current level of funding (status quo) in the future will be adequate to maintain current levels of service and maintenance schedules. However, funding for new vessels is an issue as Maine has had limited success in procuring federal discretionary funding for them. A 20% increase in funding would support needed rehabilitation on crew quarters and allow contracting with private operators to handle seasonal demand that exceeds capacity. If funding were cut 20%, maintenance of vessels and facilities would again be deferred. This would be costly in the long run, as capital would need to be replaced sooner.

5.5.5 Vanpool/Carpools/Park and Ride Lots

MaineDOT is currently expanding the Portland and Augusta rideshare programs with a budget of $350,000 per year. This amount is adequate to incrementally establish the program statewide.

5.5.6 Bicycle/Pedestrian Network

Improvements to the bicycle/pedestrian network are funded through two primary sources: Transportation Enhancement funds and Surface Transportation Program funds. The Transportation Enhancement program is a TEA-21 program of which bicycle/pedestrian facilities are an eligible category. These funds have been used to construct most of the shared use paths in Maine and a few municipal bike lane and sidewalk projects. At current funding levels, about $2.5 million/year is invested in bicycle/pedestrian projects.

The estimated cost to complete the three trails of Statewide significance (Mountain Division, Downeast, and Eastern Trails) is over $70 million. Since some of the Enhancement funds go toward municipal projects, these trails could take between 35 to 70 years to complete. Any decreases in funding would lengthen this time frame or reduce funding to improve bicycling and walking facilities in local municipalities.

Androscoggin River Bike Path (Brunswick/Topsham)

5.5.7 Intermodal Facilities

The three intermodal facilities planned at Auburn, Trenton, and Bangor will cost approximately $3 million each. Funding has not been secured for the implementation of these projects, though $850,000 is budgeted for planning and design. These facilities are expected to have income-generating potential to assist with operating and maintenance costs.

5.6 Freight

Funding for freight transportation comes from a variety of sources due to the non-traditional nature of these projects. Frequently, the Maine State Legislature through appropriations or bond funding makes funds available. When sufficient public and commercial benefit is demonstrated, the Maine Port Authority, with its revenue bond capacity, can become involved in projects. Also, federal CMAQ funds have been used for freight projects that substantially improve overall air quality. Lastly, traditional highway funds have been used frequently for a variety of motor carrier projects.

5.6.1 Cargo Ports

The initial major investments in the three cargo port piers have been completed. However, backland developments and intermodal connections need additional funding. If proposed private funding is stable, the Maine Port Authority may be able to work with some private investments, but some public funding is needed for true partnerships, approximately $3 million per year. The Office of Freight Transportation attempts to partner with private industry to leverage as much private funding as possible. Stable funding of the SHIP program will also provide needed infrastructure improvements like piers, boat ramps, floats and public water access to Maine's coastal communities. Reduced funding will naturally result in deferred maintenance of marine structures and loss of potential business and employment. SHIP is currently funded at $1.5 million for the FY 02/03 biennium though the need is approximately $2 million every biennium. SHIP funding supports a healthy working waterfront economy.

5.6.2 Freight Rail:

Currently 97% of Maine's active track will not support a 286,000 lb. rail car, which is the rail industry standard. Installation of the 132 lb. rail needed to support the heavier car over Maine's 1,200-mile system is a capital investment that the Class II carriers cannot undertake alone. It is estimated that the cost for acquisition and installation of heavier track is approximately $208,000/mile. For Maine's entire 1,200-mile system, the cost is nearly $250,000,000. With this improvement, Maine's rail operators have the ability to move the new generation of freight cars. Without investment in the heavier track, much rail traffic will be lost to trucks, increasing highway damage and maintenance costs, as well as increasing congestion and air pollution. Since rail is usually considered 10% more efficient than truck (depending on distance), this continued avoidance of investment in lower cost alternatives perpetuates high pavement and bridge consumption.

The state's rail system has benefited from the recent major investments in mainline track and sidings through the Industrial Rail Access Program (IRAP). Increased funding will help protect the public interest in the Bangor & Aroostook Railroad bankruptcy and fully take care of the backlog of interest in IRAP projects. This will create new traffic and job opportunities, and maintain state-owned track and connections to national Class I carriers. IRAP is a successful and popular program. An estimated $1 million per year will support an ongoing IRAP/economic development program.

Level or decreased rail funding will result in deferred track and rail bridge maintenance and possible loss of connections to national/international Class I carriers. Significant cuts in rail funding could result in emergency and safety concerns. Current rail maintenance funding is at $150,000 per year for the State's 300 miles of track. A much higher level of funding is needed, as there is a substantial backlog of work on state owned track. A funding level of $1.6 million per year in maintenance funds is needed just to stay even.

5.6.3 Motor Carrier

If funding increased, the Motor Carrier programs would provide increased ITS-CVO activity for the trucking community resulting in faster credentialing and more efficient enforcement/inspection stops. It would also result in better motor carrier infrastructure such as rest stops, truck climbing lanes, etc. Stable or reduced funding here would result in possibly decreased motor carrier safety practices and result in increased bridge and pavement wear. There is current funding to support initial ITS-CVO projects in the $300,000 - $500,000 range; however, this level can be reduced slightly in the future to $250,000 annually to comply with Commercial Vehicle Information System Network (CVISN) goals. A commitment to build one truck rest stop per biennium costs $400,000. There is a Commercial Vehicle Service Plan that provides the details to this strategy. MDOT'S Heavy Haul Network planning tool will, it is hoped, allow MDOT planners to better channel limited highway funding to those projects that will best enhance the safe and efficient flow of motor carrier transported freight traffic.